

PBDE End-of-Life Advisory Committee Meeting #1 Notes March 15, 2006

The first meeting of the PBDE End-of-Life Advisory Committee was held on March 15, 2006 at Bates Technical College in Tacoma, Washington. A copy of the meeting agenda is included in **Attachment 1* - Meeting Agenda – on the Ecology PBDE Web Page: http://www.ecy.wa.gov/programs/eap/pbt/pbde/PBDE_ac-2.htm**

The following advisory committee members attended the meeting:

Tiffany Hatch, Goodwill
David Sanders, Bromine Science and Environmental Forum
Lisa Sepanski, King County Solid Waste Division
David Stitzhal, Northwest Product Stewardship Council
Vicky Austin, Washington Refuse & Recycling Association
Richard Gimer, Carpet Cushion Council
Bob Schille, Waste Management
Jody Snyder, Pierce County Recycling, Composting and Disposal
Jim Jakubiak, Schnitzer Steel
Nancy Atood, American Electronics Association
Randy Ray, Pacific Seafood Processors Association/AEQUUS Corporation
Kyle Dorsey, Northwest Biosolids Management Association
Sego Jackson, Snohomish County Solid Waste Division
Greg Dana, Alliance of Automobile Manufacturers
Craig Lorch, Total Reclaim
J. Ray Kirby, Polymer Alliance Zone
Nancy Dickeman, Washington Physicians for Social Responsibility
Laurie Valeriano, Washington Toxics Coalition
Mo McBroom, Washington Environmental Council

Ecology staff presenting information during the meeting:

Carol Kraege
Cheri Peele

Representatives from government agencies who attended the meeting:

Cullen Stephenson, Department of Ecology
Joanne Bonnar Prado, Department of Health
Dennis Bowhay, Department of Ecology
Steve Whittaker, Department of Labor and Industries
Leslie Emerick, Department of Health
Mike Gallagher, Department of Ecology
Madeline Beery, Department of Health

Additional stakeholders and members of the public who attended the meeting:

Brad Tower, Bromine Science and Environmental Forum/Schnitzer Steel
Susan Landry, Bromine Science and Environmental Forum
Robert Ambrose, Carpet Cushion Council
Pat Dunn, Pierce County Recycling, Composting and Disposal
Earl Tower, Schnitzer Steel Industries

Marc Daudon facilitated the meeting and Laura Blackmore took notes.

Convene and Introductions

Carol Kraege of the Department of Ecology (Ecology) welcomed the advisory committee members and members of the public to the first meeting of the PBDE End-of-Life advisory committee, and asked everyone to introduce themselves and name their favorite movie of 2005. Advisory committee members, representatives of government agencies, and additional attendees introduced themselves, briefly stated their affiliations, and identified their favorite movies.

Carol reviewed the updated agenda with the group. She stated that Ecology wants to have a fairly tight scope for this process, and is looking for direction on whether they've identified all of the key issues. Because there are a lot of unknowns, they'd also like feedback on how to get answers to many of the key questions. Carol explained that at this meeting, the advisory committee would discuss methodology and how best to use Ecology's limited funds for sampling.

Purpose and Process

Marc Daudon advised the group that the advisory committee is set up as a consultative process. While members' input is essential to developing findings, recommendations, and other outcomes, Ecology is responsible for the final product. Marc also noted that although achieving consensus is desirable, it's not the goal of this committee's work.

Marc stated that the advisory committee's main roles are as follows:

- Provide information – each member has knowledge to bring to the table
- Communicate stakeholder perspectives
- Contribute to identifying solutions and preferred outcomes, and being creative in identifying ways to protect human health and the environment.

Marc reported that in advance of this meeting, he asked each member what he or she wants the process to look like. From this informal survey, Marc gleaned the following themes:

1. Many members don't have expertise in end-of-life issues for products that contain PBDE. These members want to know what the choices, options, and problems are, and how these might affect their constituencies.
2. There was a universal request that the process be fair and open. Everyone wants to ensure that the facilitator isn't biased and that Ecology doesn't have a preset agenda. Good communication is essential to this process.
3. Everyone wants a productive process that moves forward effectively. Many members have been working on this issue together for several years and want to maintain that forward momentum; they do not want to revisit the Chemical Action Plan (CAP). Many members have a real desire for shared problem solving.
4. Members want the outcomes of the process to make common sense. They should be reasonable, objective, and based on good science. Even if members don't always agree with the outcomes, everyone should be able to see where the outcomes are coming from.

These themes helped shape the following set of ground rules:

1. Be respectful.
2. No interruptions, cross talking, or talking to your neighbor or partner. Please mute cell phones. Please wait for the facilitator to call on you before speaking.

3. Stay on topic.
4. Observe time frames.
5. Try to understand other people's perspectives.
6. Please hold public comment until the end. However, the facilitator will call on people at the end of sessions if there's time or if it seems particularly germane. If members of the public feel they are not being treated fairly please see the facilitator at the end of the meeting.

Marc stated that these ground rules arose from member input, and advised the committee that he will enforce them.

Advisory committee members had the following questions and comments on Marc's presentation:

- **Is it possible to change the committee's name?** One member expressed dismay at the somewhat morbid sound of "end-of-life." There was moderate support around the table for changing the name, although one member noted that there are perhaps more pressing issues to spend time on. Another member suggested changing the name to the Exposure Pathway Advisory Committee. Ecology will consider alternatives.
- **One member wants to revisit the CAP.** He thinks it's important to do so, since the CAP has exemptions in it for landfills. He is concerned about PBDE disposed in landfills in auto fluff as daily cover. He stated that if the committee does not revisit the CAP, the issues that the committee can consider will be predetermined, so there is little reason to participate. There may be no reason to ban certain products if the wastes are managed properly. Marc responded that many members included not revisiting the CAP in their desires for this process, and that he would let Carol Kraege address this issue in her comments.
- **The committee's purpose should include identifying and quantifying the problem.** A member of the public commented that the committee should quantify what it considers to be the threat to human health and the environment, and move on from there. Marc said that Ecology would like committee members to bring any information they may have to the table to help identify the scale at which problems need to be addressed.
- **Members would like copies of the sign-in sheet and presentations.** Marc assured members that the list of attendees would be included in the meeting notes that will be sent out to all. Ecology staff announced that they will post all meeting materials, including presentations, on the project website.

Marc asked Cullen Stephenson, Ecology's Director of Solid Waste, to say a few words about how he sees the advisory committee's work fitting with Ecology's priorities.

Cullen thanked everyone for coming, and said that it's an honor for Ecology to have their participation. As Manager of the Solid Waste and Financial Assistance Program at Ecology, he has been trying to figure out where the PBT (persistent, bioaccumulative toxin) effort fits in the agency. Ecology is coming to the realization that it strongly affects solid waste because manufacturers are phasing out PBTs, making landfills and end uses key issues. Solid Waste has been working on this issue for about five months.

Cullen also discussed process, noting that Ecology asked Marc to facilitate this process because he did a really good job facilitating the CAP process. He stated that

Carol Kraege is running this process because she has the capacity to do it. Cullen concluded by saying that he will attend because he's responsible for the political agenda and smoothing things out sometimes, and then turned the meeting over to Carol.

PBDE End-of-Life Management: Issues and Concerns

Carol Kraege presented Ecology's perspective on the End-of-Life Advisory Committee's purpose and the desired outcomes of the process (**Attachment 2* - Ecology's Issues and Concerns**). Carol stated that Ecology wants to assess end-of-life practices, and whether those practices are protective of human health and the environment. She asked the group to think about whether there are other things that Ecology should recommend. The status quo is an option. Ecology wants this to be a fair process, which is why this committee is so big. It's a difficult issue to grapple with, and Ecology has a relatively short period of time to come up with a set of recommendations to address the problems identified. The recommendations will be directed to Ecology, the Department of Health, and local solid waste regulators, which are usually the local health departments. Carol said that she thinks that rules are also a possible outcome, and are more likely than legislation, although Ecology may want to ask the legislature for funding.

Carol noted that this process arose out of a recommendation in the CAP process. Ecology wants to look at issues associated with products being thrown away, since there are millions of pounds of PBDE in products being disposed of. There is a lot of disagreement on what that means, and a dearth of understanding of how that happens. This issue brings up lots of questions about where the pathways are.

Carol reiterated that this is not an extension of previous processes: this is a new set of issues. Ecology has not changed its opinion that penta, octa, and deca should be banned, even though the Washington State Legislature did not choose to act on Ecology's recommendation this session. The lack of a ban changes the framework a little bit because production of PBDE-containing products will continue, and Ecology can't predict when the peak of products reaching the end of their useful lives will be. But Ecology still thinks it needs to move ahead to be sure current practices are adequately protective.

Lastly, Carol defined the term "end of life" to mean the time when the first purchaser of a PBDE-containing product gets rid of it.

Advisory committee members had the following questions and comments on Carol's presentation:

- **Please explain how this process is coordinated with what's going on in the legislature.** Carol responded that Ecology has been working with the Legislature to try to get legislation passed that corresponds with their recommendations, but hasn't been successful thus far. Ecology doesn't have that much control over the legislative process.
- **What do we expect the legislature to do with the results of this process?** The PBDE CAP contained recommendations to the legislature, but the agency did not request a ban bill, though we did support one that was introduced. The PBDE CAP is meant to inform the legislature on the issue. Cullen also responded that if this advisory committee comes up with something that's relatively close to consensus, that's very powerful, and the legislature rarely goes against that consensus. If the committee doesn't

achieve something close to consensus, then each stakeholder will have to go to the legislature from his or her different perspective.

- **Although Ecology says that exposure pathways are poorly understood, the objectives make it sound like Ecology has concluded that there is a threat.** Carol noted that some studies indicate that landfills may be a source of PBDE to the environment. Ecology needs to determine whether current waste-management practices are adequately protective. The member who raised this issue reiterated that the committee should be careful not to jump to a conclusion about a threat that hasn't been documented yet. Another member responded that the CAP cites studies that show that PBDE do leach out of products, making disposal a likely issue. Marc asked if it's fair to say that Ecology and the Department of Health (Health) have concluded that PBDE adversely affect human health and the environment, and that the purpose of this process is to determine whether end-of-life practices pose a threat.
- **Does Ecology have data on penta, octa, and deca PBDE individually?** One member commented that the committee needs to differentiate between different types of PBDE. Manufacturers have removed penta and octa from products voluntarily, but are not convinced that deca is a problem. Carol responded that Ecology is concerned about deca because it may de-brominate into penta and octa. Joanne Bonnar Prado of Health concurred, and noted that public health officials often must move to prevent exposures to harmful substances based on incomplete data.
- **At this time, would Ecology recommend that all three types be banned?** Carol said that Ecology's recommendation is to ban penta and octa now, and to ban deca once safer alternatives are available. One member noted that banning all three types may adversely affect recycling of products that contain PBDE, particularly plastics used in electronics. Perhaps there is some level of PBDE that is safe and that would allow recycling of PBDE-containing products.
- **Members disagreed about whether deca contributes significantly to the levels of penta and octa PBDE in the environment.** One member wanted to go on record as pointing out that the European Union has conducted risk assessments that concluded that deca does not contribute significantly to octa and penta levels in the environment. A member of the public concurred, saying that he thinks the recent bill proposed in the legislature failed to pass because the evidence that deca poses human health threats is weak. In response, a member pointed out that neurotoxicologists are concerned about exposures to toxins at very low levels, especially in utero and during the first years of life.
- **Make sure we focus on the extent to which end-of-life practices pose a threat to human health and the environment.** Several members discussed the need to remain focused on this essential question, so as not to revisit previous processes and appear to be jumping to conclusions. Carol agreed, noting that Ecology framed the question as follows: Do current end-of-life practices for products containing PBDE adequately protect human health and the environment? This is a pretty complicated question. It includes landfills, auto fluff as daily cover, recycling of plastics and foam, and reuse of biosolids and upholstered furniture. Furthermore, Carol asked the group how Ecology should decide whether a current practice is inadequate. Ecology will have to struggle with developing the criteria for changing any particular practice, or standards to protect workers. Carol also noted that there are some environmental justice issues, including whether reuse

programs result in concentrations of PBDE-containing items in low income homes. Lastly, she asked the group to think about whether Ecology's focus areas are the right ones.

- **What does Ecology mean by reuse?** Carol said that they mean reuse through major charities with no alteration to the product. They do not include garage sales or passing things on in the family.
- **How did Ecology select its focus areas?** Carol responded that the agency looked at what they know about various waste streams and products that contain PBDEs, and connected the dots. Ecology didn't try to include all products that contain PBDE; rather, the agency chose to start with products that have a lot of PBDE.
- **There is a disconnection between studies that show that the major exposure pathways are the air and diet, and Ecology's focus areas.** One member asked if the committee is focusing only on end of life, or whether the committee is also trying to determine exposure pathways. Carol reiterated that Ecology wants to focus on end of life, not the exposure pathway issue. The purpose of the committee is to figure out whether current end-of-life practices are adequately protective of human health and the environment. Ecology recognizes that the biggest problem with PBDE may be household dust; that is why they recommended a ban on PBDE in all new products. With a ban in place, the next logical step is to focus on existing products so that they are handled in a manner that is protective.

Stakeholder Input: Key Issues, Questions, and Concerns

Next, Marc asked each member to state their key issues and focus areas. The project team will compile all the key issues to create the work plan for this committee. He also asked members to identify what they could contribute to analyzing the issues and developing solutions. Marc asked members not to dissect each other's key issues at this time, but encouraged them to ask clarifying questions as needed.

Sego Jackson of the **Snohomish County Solid Waste Division** hoped to take a fresh look at this issue, set preconceptions aside, and look clearly and cleanly at what's going on. The Division's big concern is that the committee be really careful how it interprets what it finds in this process. The Snohomish County Solid Waste Division can offer help with testing leachate from its closed landfill. It also has relationships with other facilities that could be beneficial.

Craig Lorch of **Total Reclaim**, a private electronics recycler, noted that flame retardants don't really add any value in the plastics that Total Reclaim handles. Therefore, PBDE is really a negative from his perspective, especially with worker safety. Total Reclaim's main issues are related to the end destinations of products and worker safety. Total Reclaim can be a place to look for lots of information, since it is a large facility that manages a lot of material.

J. Ray Kirby said that the **Polymer Alliance Zone's** emphasis is on reuse and recycling plastics, largely from electronics. The group is interested in understanding what is permissible, and what the facts are. He can explain how to put the plastics into the right pile in a recycling operation. Sego Jackson also noted that J. Ray could help demonstrate recycling technology.

Greg Dana works for the **Alliance of Automobile Manufacturers**, which is very interested in keeping some sort of environmentally friendly flame retardant in cars. His organization can contribute to the discussion of what flame retardants are in cars.

Joanne Bonnar Prado noted that **Health's** mission is to protect human health. She is participating as a technical committee member, and is working with Ecology on PBDE end-of-life issues.

Tiffany Hatch of **Goodwill** confessed that she was asked to come and join this meeting without a whole lot of background. Goodwill's concern is that the process will require the charity to add some additional sorting to their recycling and garbage lines. Some of the products of concern come into their stream.

Dave Sanders said that the **Bromine Science and Environmental Forum** (BSEF) is interested in participating in the evaluation process to determine whether there's significant exposure in Washington that should be of concern, and helping to develop methods for end of life. BSEF thinks landfill and incineration both apply. BSEF has started a program in which they work with their customers to be sure they're handling material properly to reduce the introduction of deca into the environment. BSEF could contribute help with analytical methods.

Lisa Sepanski noted that the **King County Solid Waste Division** has the ability to influence where the products would go. The Division's interests are making sure that the policies are the safest ones for the most people, and prevent harm to human health and the environment. King County could contribute to the analysis of landfill leachate.

David Stitzhal represents the **Northwest Product Stewardship Council** (NWPSC), which is satisfied that there is a sufficient issue with PBDE to be concerned from an environmental perspective and an economic perspective, like with Total Reclaim. NWPSC wants to be sure the committee uses the precautionary principle. Another general approach is to determine how this issue affects local government. NWPSC can contribute its involvement with local governments and its ties to federal actions on these issues.

Vicky Austin said the **Washington Refuse and Recycling Association** (WRRRA) believes the committee must come to concrete conclusions about whether current practice is adequate. The answer must be rational and based on sound science, not emotion. WRRRA believes strongly in no ban without a plan. WRRRA believes that bans without plans for effectively handling the materials result in more problems with public health and safety and the environment. WRRRA can contribute their expertise in working with solid waste for many years statewide.

Richard Gimer noted that the **Carpet Cushion Council** would say that a plan should include recycling as a better alternative than disposal for bonded foam carpet cushion. It's 100% recycled material consisting of post-industrial scrap and post-consumer scrap (called take-up scrap). The problem with PBDE bans is that if the scrap is not recycled then the only other alternative is to send it to the landfill. Richard summarized the results of research into the levels of PBDE in bonded carpet cushion, which are presented in **Attachment 3* - Bonded Foam Carpet Cushion Research Results**. In essence, this research shows that bonded carpet cushion made before 2005 contains about 0.5 to 0.8% penta by weight, and that new

bonded carpet cushion manufactured in 2005 contains about 0.12 to 0.13% penta by weight, which is very close to the levels in state regulations. Penta levels will continue to decline as more penta-free scrap is used in making new carpet cushion, especially since new carpet cushion can contain only up to 55% post-consumer scrap. The Carpet Cushion Council can sponsor testing and provide factual information about the industry, and has access to all leaders of the industry. The Council considers their data to be highly reliable.

Bob Schille stated that **Waste Management's** concerns are worker safety issues and impacts to waste facilities. Bob also represents a hazardous waste landfill. The company may be able to contribute data regarding those facilities from other operations across the country.

Jody's Snyder said that **Pierce County Recycling, Composting and Disposal's** (PCRCD) interests include identifying the problem the committee is trying to address, knowing the science, identifying what end-of-life alternatives are available, determining whether changes will create more of a problem than the status quo, and knowing what the data means before sampling. The company can explain how a subtitled D lined landfill operates.

Cullen Stephenson said that **Ecology** will bring Marc, Laura, Cheri, Carol, and Mike to this process. If Carol can't answer the committee's questions he can be called on.

Laurie Valeriano of the **Washington Toxics Coalition** (WTC) stated that her organization is concerned that there's a significant problem. She doesn't think that there's a good solution once products get to the end of life. The Coalition is concerned that regulators and manufacturers are continuing to allow these chemicals back into products and homes and the environment. Her organization is particularly concerned about the incineration of these products, and about PBDEs being recycled or downcycled back into things like children's toys, so they are interested in the technologies that identify and remove these compounds before they're recycled back into consumer products. They are also interested in looking at where responsibility lies in dealing with the clean up at the end of life, and they do think that because manufacturers have put these products into the waste stream, they bear responsibility. WTC can contribute a whole range of things from scientific expertise to research into the numbers. WTC also has expertise on end-of-life management. Laurie's particular expertise is in incineration.

Jim Jakubiak of **Schnitzer Steel** is an iron and metal recycler and also a fire commissioner. His firm is interested in the worker health standpoint. As a fire commissioner, he is interested in how the fire industry got to this point of creating an unintended consequence. His main goal is to avoid unintended consequences, and learn from this process as we move forward in the future. Jim would like to compare the benefits to the risks – is the health risk of PBDE greater than the risk of no flame retardants? He is interested in practical solutions, and does not like to see products banned. Jim can contribute his time, expertise, and passion for the issue.

Nancy Atwood of the **American Electronics Association (AeA)** is here to see how decisions made about PBDE end-of-life would relate to the recycling just mandated by the legislature and how that affects the manufacture of their products. The AeA is also interested in the trade-off in fire safety and product reliability. On a personal level, Nancy asked for a discussion of reuse and why it is included. Reuse does not

change the product, and she considers reuse a personal decision. AeA members might be able to help with questions about manufacturers.

Randy Ray of **Pacific Seafood Processors Association (PSPA)** stated that fish have more PBDE in them than any other product on the planet, and the Association sells fish. PSPA feels that the CAP didn't address how PBDE gets from manufacturers to fish, and hopes that this group will look at exposure pathways. PSPA is concerned with recycling because it makes PBDE available for air dispersal, and also may affect workers. PSPA is concerned about landfills, because best management practices direct landfill operators to cap landfills with auto fluff, which contains PBDE. Sunlight helps break congeners down, so perhaps that's the problem. PSPA is concerned about biosolids, because biosolids make PBDE biologically available. PSPA hopes that this committee will look at how these things relate. PSPA doesn't want to ban anything, and feels that as long as products are handled properly they're not necessarily a problem. The question is: are we handling PBDE well? PSPA can contribute an expert in Seattle who can give presentations using peer-reviewed data to try to come up with answers on exposure pathways.

Nancy Dickeman said that **Washington Physicians for Social Responsibility's** concern is protection of health. PBDE are ubiquitous, so people can't choose to be exposed. The group also would like to see responsibility divided fairly – it's a manufacturer's responsibility issue, not just for recycling and waste management folks. Her organization can contribute toxicology, medical and health provider input. Nancy also noted that she is interested in seeing the process moving forward from the CAP.

Kyle Dorsey represents the **Northwest Biosolids Management Association**, whose immediate concern is that recycling of biosolids remains an option. Wastewater treatment plants are at the end of the pipe for PBDE, and there is no way for them to turn off PBDE. Treatment options are available but extremely expensive, and there is no easy solution. Members have already invested heavily in recycling biosolids. Their concern is that this will lead to new operational requirements or standards; if so, the Association would like them to be valid and in proportion to their share of the problem. The Association can contribute very astute technical people who can look at information, and may be able to collect additional information through its connections. Historically, their membership has been very cooperative, and has worked very hard to do the right thing.

Mo McBroom of the **Washington Environmental Council** said that her organization's interest is in formulating policies with broad support that will discourage use of PBDE, especially penta, in products. The Council wants to ensure that management of PBDE will promote a strong recycling industry and will balance the needs of the industry with the needs of the environment. Before identifying the Council's contribution, Mo would like to ensure that her presence is not redundant. However, Mo has been working on e-waste, Puget Sound, and lots of related issues for a long time.

Marc asked whether any individual or interest was not at the table. Ideas from the members included the following:

- Upholstered furniture industry
- More representation from product manufacturers, depending on which products the committee focuses on
- Plastic resin suppliers

- Septic tanks
- Stormwater managers
- Wastewater treatment plant effluent

Marc brought closure to this session as follows:

- He stated that the next step is to go back to Ecology's list of the materials and focus areas to be sure the process will cover all of the committee members' areas of concern.
- He noted that the committee's purpose is to identify the highest priorities. If the committee ends up leaving something out, it's important that everyone understand why.
- He restated the key issue: how will Ecology decide if a current practice is not adequate?

Cheri Peele clarified that upholstered furniture and biosolids were included on Ecology's list because the agency didn't have enough information on them when they were developing the CAP to make a recommendation one way or the other, so they were lumped into this process even if it's not a perfect fit. Ecology wants to look at things that the agency can affect, so for reuse they are interested in the charities, not in handing things down in the family. Since there's a possibility for an environmental justice issue, Ecology needs to look at reuse.

One member restated the key question as follows: are there exposure pathways from disposal, recycling, and reuse and what is the degree of their significance?

Overview of Methodology and Research

Cheri Peele presented the approach that Ecology took to developing the draft scope of work for this committee ([Attachment 4* - Overview of Methodology and Research](#)). She said that Ecology used two strategies to develop the framework: first, they started with questions that arose from the CAP process, and then undertook a systematic consideration of end-of-life issues. That systematic consideration included developing two matrices that summarize known information about the products of concern and disposal facilities ([Attachment 5* - Product and Disposal Facilities Matrices](#)). It also includes developing a mass-balance equation for PBDE which attempts to put end-of-life practices into the broader context of all possible exposure pathways. In conclusion, Cheri asked committee members for their feedback on this methodology, any additional data they might have, input on how to make value judgments between various policy alternatives, and creative solutions to this problem.

Advisory committee members had the following comments and questions on the product and facilities matrices:

- **What is fate?** Cheri responded that the term "fate" in this context refers to environmental fate, or what happens to PBDE after it is included in products. For example, do computers release PBDE into the environment, either during use or at the end of their useful lives?
- **Can Ecology distinguish between the fate of PBDE during use and at the end of a product's life?** Cheri said that what we do know is that PBDEs are in dust samples and wipe samples, however we are not aware of any

studies which try to quantify the rate of loss of PBDEs while the product is in use or at time of disposal.

- **What is the General Info column of the Products matrix for?** Cheri said that it's for general information like PBDE type in each product, which the other columns (reuse, recycle, etc.) do not affect. Cheri agreed to rename it. One member also asked for an Initial Use column, to quantify the amount of PBDE released during a product's life.
- **On the Disposal Facilities matrix, change "C&D Landfills" to "unlined landfills."** Not all unlined landfills are C&D landfills.
- **Does Ecology expect manufacturers to know which type of landfill their products are disposed in?** Cheri said no. The purpose of the matrix is to help Ecology summarize the issues associated with these different types of landfills.
- **Include information on air dispersal and what types of PBDE are bioavailable.** This information may help sort out which sources of PBDE are actually threats to human health and the environment.
- **Members suggested additions to the Facilities matrix.** These ideas included industrial wastewater treatment plants, recycling facilities, and places like Goodwill that store PBDE-containing products for long periods of time before they get reused.
- **Members suggested adding information about what products PBDE-containing products are recycled into.** Cheri said that Ecology might have some of that information.

Advisory committee members had the following comments and questions on the mass-balance equation:

- **Does Ecology have data to plug into the mass-balance equation?** Cheri said that much of the data is lacking, but Ecology uses the equation more to remind them to ask the right questions and search for data.
- **Who will fill in the mass-balance equation, and with what?** Ecology has an internal technical committee that is filling in the mass balance using any good data they can find. Ecology has a very small budget for sampling.
- **Include losses of PBDE during manufacturing in the mass balance.**
- **Does the annual basis of the mass balance mean some PBDE might be double-counted?** Cheri said that the time element makes the mass-balance equation tricky. Although Ecology is interested in knowing how much PBDE has been deposited in the landfill from the 1970s until now, they're also interested in knowing how much PBDE is moving from place to place in a given year.
- **Why not just subtract the pounds of PBDE thought to have entered the environment from the total pounds of PBDE ever produced?** Cheri responded that the mass-balance equation is an attempt to do that in a way that accounts for how the data were produced.
- **Why is Ecology producing a mass-balance equation when all the agency is interested in is end of life?** The mass-balance equation will help put the costs associated with changing end-of-life practices (if necessary) in context.
- **Look at exposure pathways rather than where the PBDE is now.** One member feels that questions about exposure pathways are the questions that count.
- **Make sure the analysis centers on the focus areas the committee discussed earlier.**

- **One member was unconvinced that this approach would yield enough useful information to do anything.** Cheri responded that the purpose of this approach is to ensure that Ecology continues to ask the right questions to be sure they don't miss any data that are out there. Another member said that what Ecology was doing was creating a context for this discussion that will help identify data gaps as the group tries to come to some decisions.

Approach to Key Issues and Research Plan

Next, Cheri gave a presentation that showed the data that Ecology has collected to date, and how that data informed their identification of focus areas for the End-of-Life Advisory Committee ([Attachment 6* - Presentation & Discussion of Ecology's Key Issues](#)). Cheri also discussed the policy questions that Ecology is considering, and Ecology's proposal to spend their limited sampling budget on PBDE emissions from landfills and auto fluff.

Advisory committee members had the following comments and questions on this presentation:

- **Members had a number of questions about the data, particularly about the landfill data.** Cheri explained that the landfill numbers represent the amount of PBDE in all auto fluff deposited in Washington landfills since 1970, assuming that all auto fluff generated in Washington was disposed in Washington (see [Attachment 7* - Auto Fluff and Landfill Estimates](#)). Auto fluff is all that remains from a car once recyclers have removed the metal. Ecology acknowledged that this data has limitations and should be seen as very rough estimates.
- **Ecology's data is a snapshot of information, rather than an apples-to-apples comparison of products or disposal methods.** Cheri agreed that the data are flawed, but they are the best available.
- **Why would PBDE fall under the state's dangerous waste rule?** Dennis said that the bromine content of some electronic products is enough to fail the persistence test for the dangerous waste rule.
- **After Ecology samples landfills and auto fluff, to what will they compare the data to determine the relative level of risk?** Members suggested that Ecology should sample some other things also so that the sampling data can be put into some perspective. Without the ability to compare the amount of PBDE coming from landfills to the amount coming from other sources, such as products still in use, it would be easy to conclude that landfills are the whole problem. Cheri responded that Ecology is trying to get all of the information that they can, and even though there are data gaps, they must answer the question of whether their current end-of-life management practices are adequately protective. Another member said that Health is looking into the effects of PBDE in the home.
- **Focus sampling on pathways.** Some members feel that the real question is how PBDE is getting out of the landfills, if at all. Ecology should sample leachate, gas, and particulate matter, rather than what's actually in the landfill. Cheri said that Ecology was planning to sample leachate and what's blowing off the landfills. For auto fluff, Ecology plans to sample particulate matter during temporary storage in Tacoma and when the auto fluff is placed on the landfill. Other members thought Ecology should also include pathways from biosolids and other disposal methods such as recycling.

- **Some members are uncomfortable that Ecology seems to have jumped to identifying priorities so quickly.** Carol responded that Ecology is still developing their sampling plan and objectives, so she was glad to get this input from the committee.

Marc summarized the discussion, and asked the group whether they understood Ecology's research methodology; most members indicated that they were still a bit confused. He assured the committee that the project team would distribute electronic copies of all the presentations, so that members could take a better look at the data. Carol asked everyone to look at the data and send Ecology additional data or corrections, or any other feedback.

Wrap Up & Next Steps

Carol said that Ecology's next step will be to analyze the committee's input and then distribute a document that lays out how Ecology plans to go forward. She said that she felt that the committee's main points were that Ecology should look at pathways, and try to generate a sense of context around any scientific findings.

Carol noted that Ecology has reserved two future meeting dates in the same meeting room: May 2 and June 13. She will let everyone know within 2 or 3 weeks if Ecology won't have enough information by May 2 to make that meeting productive. Ecology plans to present the draft sampling plan and objectives at the next meeting. In addition, Ecology will present a straw methodology for how they might decide whether a current end-of-life practice is adequately protective.

Marc asked everyone to sign the sign-in sheet and to fill out the facilitation feedback form. One member asked that if anyone knows of good places to eat lunch nearby, to please send out that information ahead of the next meeting. A member of the public suggested making the meetings longer, to more fully utilize the time of members who fly in from other places.

Randy Ray asked for copies of every piece of literature that Ecology reviews to come up with its conclusions. One member hoped that those members who are new to the process will familiarize themselves with the output of the previous processes, so that everyone is on the same page as a starting point for discussion.

Lastly, Carol thanked everyone for coming, and Marc commented that the complexity and uncertainty of this issue will make it a challenge for Ecology and the advisory committee to make choices and effect good outcomes.

*Attachments can be found on Ecology's website or obtained by email from Mike Gallagher (mgal461@ecy.wa.gov).

Meeting Adjourned